III. SITE CONDITION/DISCUSSION/MANAGEMENT ACTIONS

The following information was collected from existing reports, maps, databases, people familiar with the site and from site visits.

This section provides some basic information about the site and describes important biological features, natural processes and public use patterns. Most sections include a brief discussion of management issues followed by management actions designed to achieve the management goals of the NRCA.

Plant and wildlife information was gathered from agency biologists, the Natural Heritage database, Washington Department of Fish and Wildlife databases and past inventories of the Loomis Forest. Federal and state designations and, global and state ranks were examined to determine species rarity and degree of threat to its continued existence. Rare species that are highly threatened are addressed in this plan. See Appendix C for more information regarding federal and state status categories and, the global and state ranking system.

A.Physical Features and Conditions

This section provides general site information and does not include discussion or management objectives.

Geology

North Block

Geologic bedrock in the north block is comprised primarily of light-colored, crystalline, granitic rocks that have been assigned to three units. These include granodiorite and quartz monzonite of the Jurassic-age, Similkameen Pluton, possibly older but similar, light-colored crystalline igneous granitic rocks of the Loomis Pluton, and Tillman Mountain tonalitic orthogneiss. Orthogneiss is a metamorphic rock that started as an igneous rock but was subsequently metamorphosed through heat and or pressure changes. The Loomis Pluton and the Tillman Mountain tonalitic orthogneiss have been assigned a Triassic to Jurassic age and may predate the rocks of the Similkameen Pluton.

Nested or faulted to a position within this extensive package of granitic rocks are several smaller occurrences of older (pre-Jurassic) undifferentiated, high-grade metamorphic rocks and a suite of unusual rock types that have been assigned to the Chopaka intrusive complex including metagabbro and ultrabasic rocks.

The recognition and naming of many of these units comes from detailed geologic mapping of this part of the Okanogan range by Hibbard (1971), Rinehart (1981), and Rinehart and Fox (1972). DNR has published compilation geologic maps of the area at 1:100,000-scale (Stoffel 1990), and at a scale of 1:250,000 (Stoffel et al. 1991).

South Block

The south block of the NRCA is also primarily underlain by Mesozoic (Triassic-Jurassic) and younger Cretaceous igneous intrusive rocks. These units locally display metamorphic fabrics (foliation) or exist in packages of mixed igneous and metamorphic rocks. These igneous and metamorphic units are intruded to the east by a large pile of younger, Eocene-age volcanic and sedimentary rocks.

Glacier Activity

All of the bedrock units in the NRCA were extensively modified during the Pleistocene ice age when a continental glacial ice sheet blanketed much of North America. The maximum extent of the ice advance reached limits approximately 70 miles to the south of the NRCA. This continental glacial activity, along with local alpine glacial effects, has modified and shaped topography, including the removal of soils (unconsolidated material), and deposition of a variable mantle of glacially derived sediments throughout much of the NRCA.

Plate Tectonics

Speculation on the tectonic setting of the Okanogan range that underlies much of the NRCA has led to some interesting theories. Some authors have suggested that this area was derived in a series of Paleozoic and Mesozoic volcanic archipelagos. These landforms were then accreted onto the North American continent during the Late Triassic or Early Jurassic. Peripheral to or within these large blocks that docked with the continent were subsiding oceanic basins where exotic marine and volcanic terranes were developed. These eugeoclinal rocks were similarly scraped onto the continent or were pushed great distances inland along thrust faults. Volcanic activity (plutonism) and regional metamorphism accompanied accretion and persisted into the Late Cretaceous. Intrusion of plutonic rocks and deposition of sedimentary and volcanic rocks occurred during Late Cretaceous time and into Early Tertiary when tectonic forces are believed to have shifted from compression to regional extension. This theory is built upon geologic conditions that are represented in part by bedrock found in the NRCA as well as its position and relationship to adjacent rocks.

Minerals

All oils, gases, coals, ores, minerals, and fossils were retained for the Common School Trust as provided under RCW 79.01.224. The Loomis NRCA does not include any mining claims or prospecting leases.

Soils

Soils within the Loomis NRCA lie outside those areas mapped and described in the July 1980 Soil Survey of Okanogan County Area, Washington published by the United States Department of Agriculture, Soil Conservation Service (SCS). Site-specific soils within the NRCA are described in the Washington State Department of Natural Resources (DNR) Geographic Information System (GIS).

In general terms, soils within the NRCA are typically deep to very shallow, mostly forest soils and rock outcrop on mountainous uplands. Soil mapping units consist of various specific soil

phases within a variety of soil series. In some cases, multiple soil series characterize a given area. More developed soils occur on the flatter benches and terraces. These soils have formed in a mantle of volcanic ash and wind-blown silt (loess), overlying glacial deposits that overlie fresh to moderately decomposed granitic bedrock. Bare rock outcrop and regolith covered hillsides characterize the steeper gradient slopes and may include local accumulations of colluvium. Granitic intrusive igneous bedrock of the Okanogan range comprises much of this portion of northeast Washington, however smaller areas are comprised of more mafic-rich (iron/magnesium-bearing) igneous bedrock units (granodiorite to gabbro) and areas of heterogeneous metamorphic rocks.

Topography

The Loomis NRCA is part of the Okanogan Highlands located on the east slopes of the Cascade Mountain Range. The entire area was overridden by the continental ice sheet during the Pleistocene ice age with the possible exception of Chopaka Mountain (7,881 feet). Chopaka may have extended above the estimated elevation of the top of the ice at approximately 7,000 feet. These islands of land that lay above the top of the ice sheet are called nunataks. On Chopaka, unique flora and nunatak soils are protected in part by a DNR Natural Area Preserve.

Glacial modifications include rounded mountaintops, U-shaped valleys, glacial outwash terraces and lateral moraines. The north block is mountainous and includes Disappointment Peak (7,146 feet) and Snowshoe Mountain (7,823 feet). These mountains drain into creeks that leave the NRCA at an elevation of approximately 4,800 feet. Most the area drains to the south into the North Fork of Toats Coulee Creek and a small portion of the area drains north into Canada.

The south block includes several peaks that border the area and several creeks that drain into either Sinlahekin or Toats Coulee Creeks. The elevation ranges from approximately 7,000 feet to a low of 4,400feet. The topography in the south block is similar to that of the north block.

Climate

The NRCAs are located on the eastside of the Cascade Mountains where the climate is warm and dry in the summer. Winters are cold and bring snow. Average annual precipitation in the two NRCA parcels is between 18 and 40 inches. Average yearly snowfall varies with elevation, but average up to approximately 100 inches at the highest elevations and represents the majority of the precipitation. Winters are cold and long with frost coming any month of the year and the ground is frozen from October to May with variations due to north or south aspect. Summers are short and dry with frequent electrical storms.

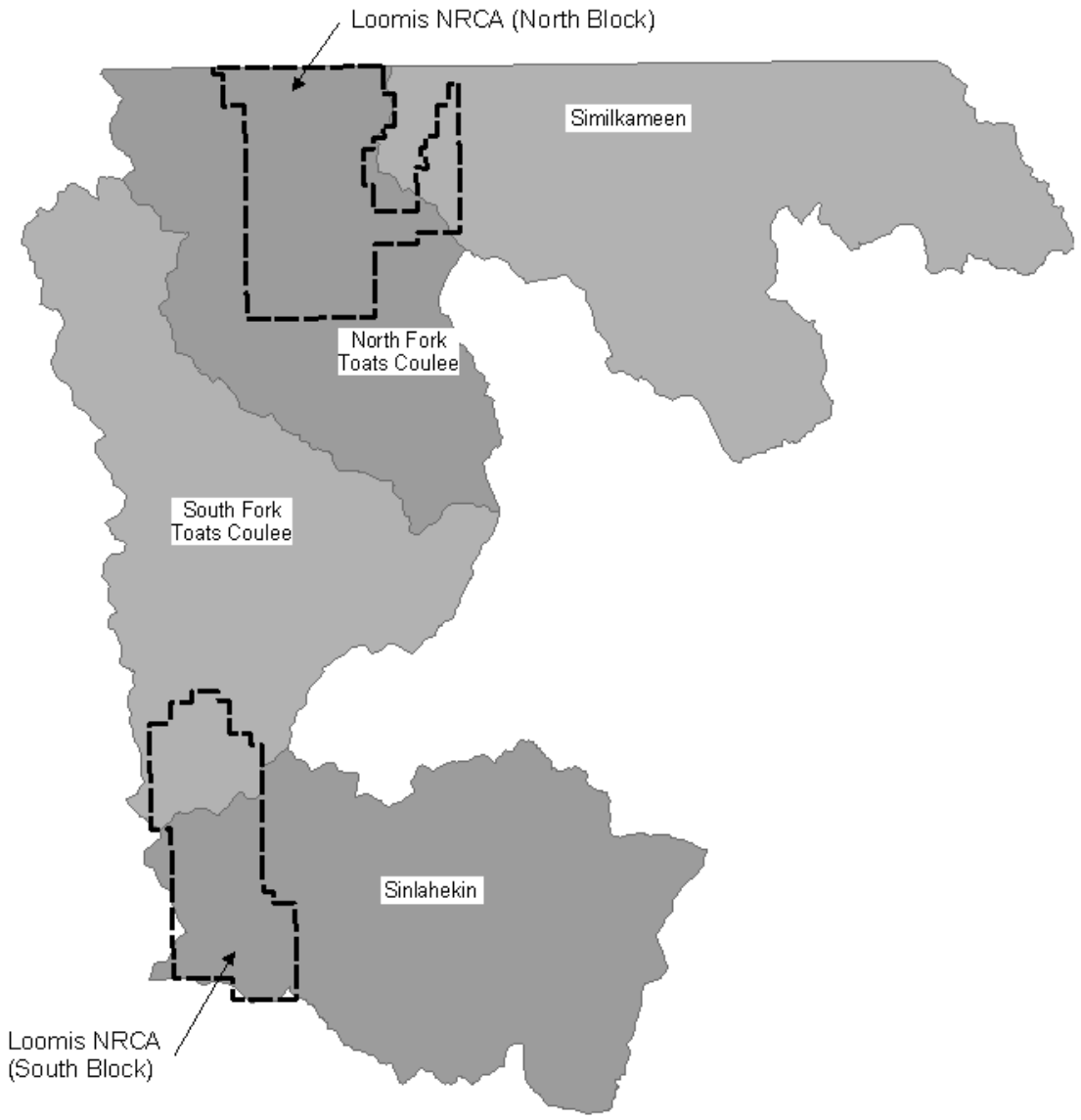
Winds are predominantly from the southwest or west most of the year, with periods of more northerly flow during the summer. Occasionally, strong winds develop from the east. Severe fire events throughout much of the Pacific Northwest are often associated with strong northerly winds or east winds during summer months.

Hydrology

The Loomis NRCA falls within three watershed analysis units (WAUs): North Fork Toats Coulee, South Fork Toats Coulee and Sinlahekin Creek (Figure 4, Watershed Analysis Units). The North Block drains mostly to the south into the North Fork Toats Coulee Creek; one (un-named) creek drains to the north into Canada. Headwater creeks include: Deer Park Creek, Little Horseshoe Creek, Snowshoe Creek, Olallie Creek, Swamp Creek, Disappointment Creek and Corduroy Creek.

The north half of the south block drains into the South Fork Toats Coulee and includes Paymaster Creek, South Fork Toats Coulee Creek headwaters. The south half of the south block drains into Sinlahekin Creek and includes Lone Frank Creek and the headwaters of Timothy Creek.

Figure 4. Watershed Analysis Units (WAUs)



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B.Forest Zones and Plant Communities

The following forest zones and plant communities are located within the NRCA: subalpine fir, Douglas fir, quaking aspen, wetland and riparian areas (herbaceous/shrub and montane coniferous), shrub-steppe, subalpine/alpine grassland and shrubland, and rock/talus. Harvested areas are also included (Figures 5 and 6, Vegetation). These zones and communities are defined primarily by elevation, aspect, and moisture conditions. The vegetation maps (Figures 5 and 6) of these zones and communities were developed using data from Forest Resource Inventory (FRIS) plots, aerial photograph interpretation, and spot field investigations. Descriptions are based on Franklin and Dyrness (1973), Lillybridge et al (1995), and field investigations made by DNR staff. Only some portions of the vegetation map have been ground-truthed, therefore it is inevitable that the map contains errors. Future ground-truthing will attempt to refine the vegetation map. Common names are used throughout this plan and scientific names are provided in Appendix D.

Subalpine Fir Zone

Vegetation throughout the NRCA consists primarily of subalpine forest types, with lodgepole pine the dominant tree in most areas. In general, the subalpine fir zone forests in the Loomis NRCA are typical of late-seral forests maintained by fire in the Okanogan region. Seral forests contain species (lodgepole pine in this case) that generally do not reproduce in their own shade or without some form of disturbance. High elevation lodgepole pine stands are dependant on fire for regeneration. When fire is suppressed, lodgepole pine trees age and die allowing climax species such as Engelmann spruce and sub-alpine fir to gradually colonize under the shade of the undisturbed seral species and eventually become the prominent species with a different forest structure. Other tree species often found in this zone include Douglas-fir, western larch, and whitebark pine. Lodgepole pine trees 80-120 years old become host to the mountain pine beetle, a native insect (Russell 1994). Mature stands of Engelmann spruce are susceptible to spruce beetles, also a native insect.

The understory in subalpine fir-zone forests varies considerably, mostly depending on the amount of moisture present. Common shrubs include grouse huckleberry, low huckleberry, Labrador tea, pachistima, shiny-leaf spirea, and Cascade azalea. Typical grasses and forbs are pinegrass, twinflower, heartleaf arnica, lupine, horsetails, starry false Solomon seal, and dogwood bunchberry (see Appendix D for scientific names).

Whitebark pine stands are occasionally found at the highest elevations within the subalpine fir zone and are susceptible to white pine blister rust, a non-native plant pathogen. A number of wildlife species eat the seed of whitebark pine including, Clark's nutcracker, red squirrel, black and grizzly bear, chipmunk, raven, Stellar's jay, and pine grosbeak. Of these species, the red squirrel and Clark's nutcracker harvest about 99% of the seeds in the Rocky Mountains. It is difficult to quantify the effect of bears on pine seeds because they obtain their seeds from red squirrel middens. It also appears that red squirrels and Clark's nutcrackers play a critical role in dispersing the seeds of whitebark pine (Hutchins 1994).

Figure 5. Vegetation - North Block

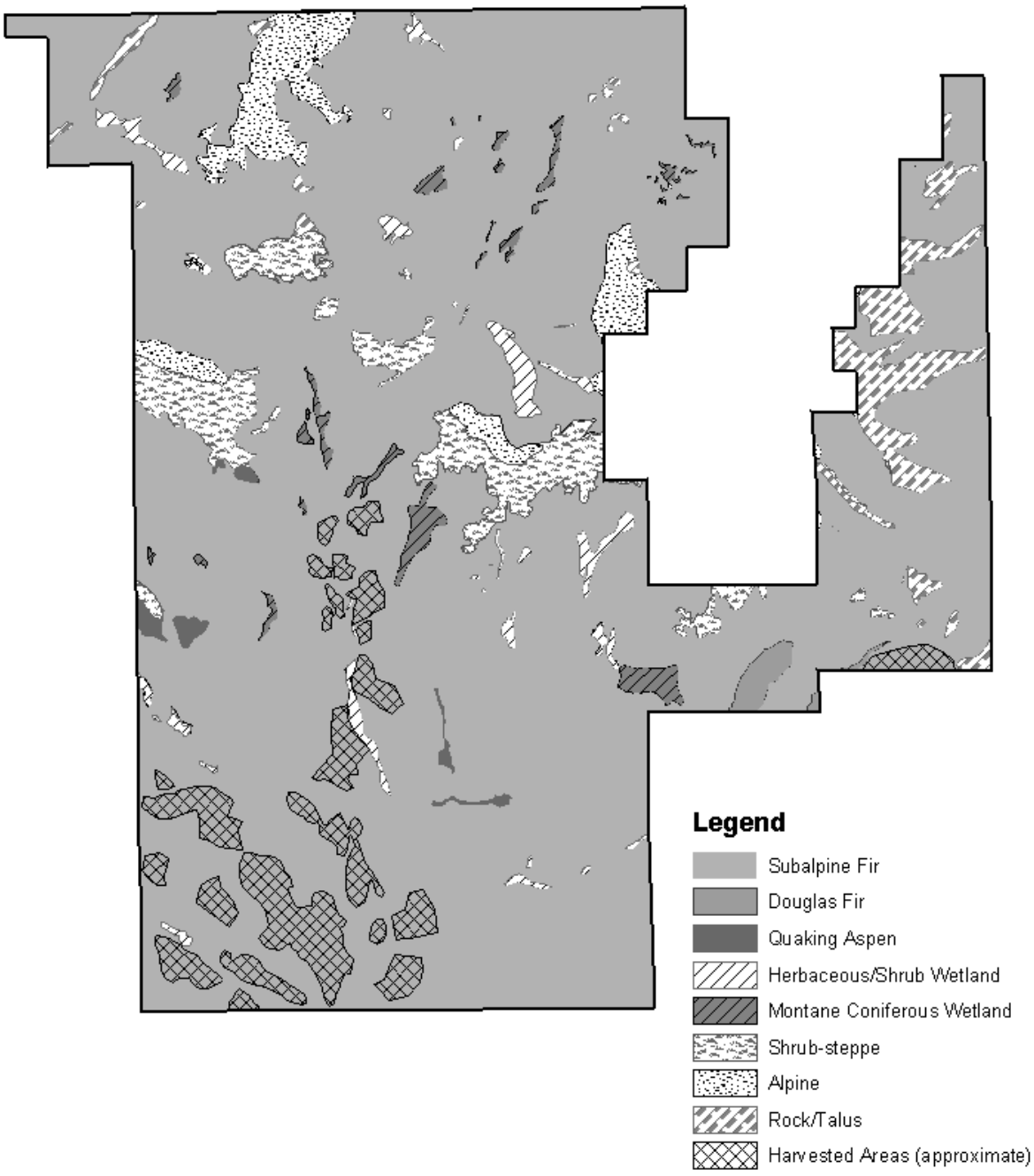

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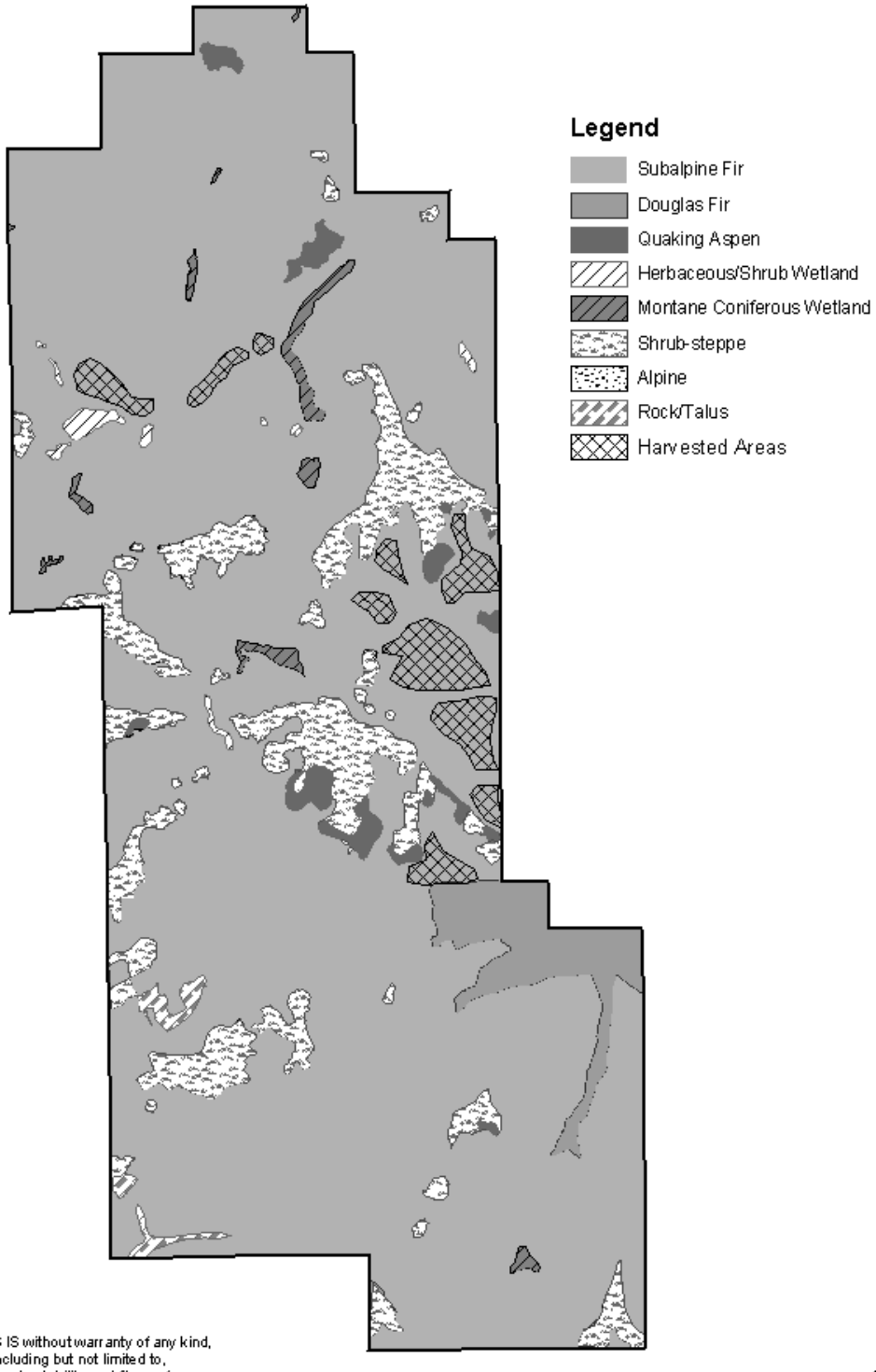
Figure 6. Vegetation - South Block



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Discussion

Overall, the large extent of the subalpine fir-zone forests and the scarcity of roads within both parcels create a significant area of contiguous, relatively undisturbed habitat for rare or legally protected species including Canada lynx and grizzly bear. The condition of the plant communities with regard to stand maturity and composition of understory vegetation varies considerably over the landscape. Older forests may be Important to ecosystem function and may provide denning habitat. If older forests become a rare feature on the landscape, then it may be important to protect it within the NRCA. The situation will be assessed by scientists and managers, and a solution for protection developed.

Insects

Mountain pine beetles (*Dendroctonus ponderosae*) are native insects that feed on the inner bark of lodgepole pine trees (other host trees include ponderosa and white pines, Douglas-fir, true firs, spruce and larch). It is normal within the natural system for 80-120 year old lodgepole pine stands to die from mountain pine beetle activity. Usually a variety of stand ages create a diverse forest where only a fraction of the trees serve as hosts for the beetles thus limiting the extent of dying trees.

Past stand replacement fires in and around the Loomis NRCA occurred close enough together to create large areas of relatively even-aged lodgepole pine forest. As the trees reached 80–120 years in age in the late 1980s and early 1990s beetle populations reached epidemic levels. The beetles have significantly depleted host trees and as a consequence, beetle populations are decreasing. The natural progression of the system is for fire to burn the fuels created by the beetles. In the absence of fire, sub-alpine fir will become the dominant species. Additional information is provided in the Forest Insect and Disease Leaflet #2 published by the US Forest Service.

The spruce beetle (*Dendroctonus rulfipennis*) is the most significant natural mortality agent of mature spruce. Spruce stands are most susceptible if they grow on well-drained sites in creek bottoms, have an average diameter at breast height (dbh) of 16 inches or more, a basal area greater than 150 square feet per acre, and more than 65 percent spruce in the canopy (Johnson 2000).

Endemic (normal population level) spruce beetle populations usually live in wind-thrown trees and when beetle populations increase in downed trees, beetles may enter susceptible, large-diameter standing trees. Most outbreaks in standing trees originate in wind-thrown trees (USDA, Forest Insect and Disease Leaflet 127).

In summary, the bark beetles are part of the natural system and in general are not a threat to the natural resources in the Loomis NRCA.

Disease

Whitebark pine stands found in the subalpine fir zone may be reduced or extirpated by white pine blister rust (*Cronartium ribicola*), an introduced fungus that infects whitebark pine trees. White pine blister rust has caused high levels of mortality in this species in other portions of the Cascades, the northern Rocky Mountains, and in Canada. White

pine blister rust infects trees via the needles and then spreads to other portions of the tree through the cambium. It will kill branches or entire trees, readily infects saplings and seedlings, and makes infected trees more vulnerable to other diseases and insects.

Signs of this pathogen have not been observed in the Loomis NRCA, however it is known to occur with high incidence within North Cascades National Park and directly to the north in Canada. Potential measures to prevent infestation or reduce the spread of this organism include: removal of competing tree species, particularly subalpine fir, through fire or mechanical thinning; and planting high-mortality areas with blister rust-resistant whitebark pine trees propagated from on-site or local seed sources.

Fire

Lodgepole pine trees make up the majority of fuels within the NRCA and they typically burn infrequently with high intensity. The mean wildfire interval in lodgepole pine forests in this region is estimated to be approximately 112 years (Barrett et al. 1997), but intervals probably vary from 70-300 years. Wildfires are either stand replacement events or partial mortality events that thin the canopy considerably. Wildfire intervals of less than 200 years will generally maintain lodgepole pine as the dominant tree species. In the absence of wildfire, some high elevation stands of lodgepole pine have progressed beyond their primary pine component into a spruce-fir type. As explained above, as the trees become older, they become more susceptible to bark beetles, trees eventually die and fuel loads increase.

DNR is directed by the fire suppression RCW (76.04.750) which states that DNR should make every reasonable effort to suppress all wildfires. The following three primary alternatives have been considered to make up for the absence of wildfire, however other alternatives may be developed in the future.

1. Prescribed fire, where fire is set on purpose under conditions that offer the most potential for maintaining control of the fire is a common management tool. However, it is not recommended as a tool for maintaining the ecological processes of the lodgepole forests in the Loomis NRCA because the nature of the subalpine fir ecosystem is set up for large high intensity wildfires that are difficult to control. In order to mimic the natural role of wildfire, the prescribed burn would need to be large (+/- 5,000 acres) and is beyond what is considered a “controlled burn”. Typically, prescribed fires are small, less than 300 acres, and would not simulate a natural burn.

2. Prescribed fire is also used for managing fuel loads in specific vegetation types. Under the “right” conditions, controlled, low-intensity fires may consume fuels. However subalpine fir zone (lodgepole) forests generally do not burn at a low-intensity. The natural fire regime includes high-intensity, catastrophic fires.

3. A third option is to allow a wildfire to burn under very specific conditions dependant on weather, location and available resources (firefighters and equipment). In order for this to happen, state fire suppression laws would need to be changed. Also, considerable thought and research is needed to explore the possibilities of this option. Mechanically creating fuel breaks around the

edges of the NRCA or in other strategic locations should be assessed and analyzed.

In summary, prescribed fire is not a suitable management tool at this time for the sub-alpine fir zone. Fire suppression is covered in the Guidelines section and in Appendix E, the Loomis NRCA Fire Suppression Plan. It is also important to note that reducing fuel loads Is not likely to decrease the fire intensity in the subalpine zone. Fuel reduction does little to mitigate fire effects in forests that have a low-frequency, high intensity fire regime because most fires occur during extreme weather conditions, become independent crown fires and cause significant mortality regardless of fuel loadings (Bessie and Johnson 1995).

Management Actions:

- Inventory and monitor the site for whitebark pine and monitor for occurrence of white pine blister rust.
- Coordinate with North Cascades National Park (and USFS) on monitoring the spread and potential management of white pine blister rust.
- Research options and opportunities to maintain the role of fire in the ecosystem.

Douglas-fir Zone

Less than 5% of the vegetation within the Loomis NRCA falls within the Douglas-fir zone. Natural characteristics of this zone include a semi-open, but relatively continuous, tree canopy dominated by Douglas-fir, western larch, ponderosa pine, and/or lodgepole pine. The understory is dominated by shrubs and/or grasses, and may be limited by dense tree growth. Common understory species in this zone include kinnikinnick, snowbrush, pachistima, shiny-leaf spirea, ninebark, common snowberry, and mountain snowberry. Pinegrass is a dominant grass throughout much of this zone.

The open structure of the Douglas-fir zone was maintained historically by a mixture of frequent, low-severity fire and less frequent, moderate to high severity fire (primarily low-severity fire regimes). Typical pre-settlement fire return intervals were approximately 10-30 years on average with occasional longer intervals (Agee 1993). Fire suppression, combined with some management practices, has resulted in dense young canopy layers and ladder fuels, which in turn have increased the probability of stand-replacement high-severity fires and insect/disease outbreaks.

Douglas-fir beetles (*Dendroctonus pseudotsugae*), a native insect, are similar to the mountain pine beetle in that they seek out old, drought stressed or crowded host trees. Beetle larvae feed on the inner bark and are generally secondary pests, killing trees which have been previously weakened by other agents (Russell 1994).

Discussion

The importance and condition of Douglas-fir zone forest within the Loomis NRCA are similar to those described above for the subalpine fir-zone forest. The small amount of

Douglas-fir zone forest in the Loomis NRCA is contiguous (at lower elevations) with the extensive subalpine fir-zone forests on the site.

Fire

Pockets of Douglas-fir stands are near border areas of the NRCA. These areas would be most suitable for fire breaks to reduce the threat of fire burning onto adjacent lands. Creating fire breaks in these areas would decrease fuel loads and move the system towards a more natural low-severity fire regime and act as a low fuel load zone. Furthermore, the creation of fuel breaks will also move the Douglas-fir forests towards a structure more typical of pre-settlement conditions. The effectiveness of creating fuel breaks in the Douglas fir zone should be assessed. As shown in figures 5 and 6, a very small portion of the NRCA is actually within the Douglas fir zone.

Management Actions

- Assess the feasibility and effectiveness of creating fuel breaks in the Douglas fir zone.

Quaking Aspen Forest

Within the Loomis NRCA, quaking aspen stands primarily occur in upland habitats as small patches (<5 acres) on south or southeast aspects. Stands are usually adjacent to shrub steppe and/or subalpine fir-zone forest. Aspen stands also are found in the vicinity of some streams and wetlands on the site. In these habitats, quaking aspen is generally the only tree present, with conifers occasionally scattered about. Understories vary from shrub- to grass- and forb-dominated vegetation. Common understory species include common snowberry and pinegrass.

Aspen stands in this area may be stable but are more likely seral to conifers (without some type of disturbance, conifers will eventually overtop them). Some stands can remain stable for decades but will eventually deteriorate as older trees die out. Deteriorated stands are typically overtaken by conifers, but on some sites, especially dry sites, shrubs, grasses, and/or forbs may become dominant. Periodic fire removes conifers and rejuvenates aspen stands.

Quaking aspen is an important habitat for a variety of wildlife. Large ungulates including moose, elk, and deer use aspen stands for foraging and cover. These species all browse on aspen, particularly small suckers that originate following disturbance, as well as many of the understory plants typically found in aspen stands. A variety of birds use aspen habitats for foraging, nesting, and cover, including cavity nesters such as owls, woodpeckers, and sapsuckers, songbirds such as chickadees, warblers, tanagers, and bluebirds, and game species including several species of grouse. Beaver are highly selective of aspen trees for both food and dam construction. The seral stage of aspen habitats heavily influences the degree of use by different wildlife species. For instance, stands of small suckers provide large amounts of forage for ungulates while older stands provide better cover.

Discussion

The condition of aspen stands with regard to stand maturity and composition of understory vegetation has not been assessed. Many stands are near seeps or other areas with high water tables that have moist soils and relatively lush vegetation late into the season. As a result, cattle grazing is concentrated in some aspen stands and likely suppresses aspen rejuvenation. Furthermore fire suppression activities also interfere with the natural rejuvenation process. Reintroduction of fire, or perhaps mechanical disturbance, may be necessary to maintain the extent of aspen stands and the mix of seral stages that are important for wildlife.

Larvae of the satin moth (Leucoma salicis), an insect introduced into North America from Europe, attack various tree species in the genus Populus, including quaking aspen and black cottonwood. The caterpillars feed on the foliage of these species and can completely defoliate trees. Extensive and repeated defoliation can result in suppressed growth, top-kill, or tree mortality. Large infestations can kill significant portions of aspen or cottonwood stands.

Signs of this insect have not been observed in the Loomis NRCA, however it is known to occur in much of southern British Columbia as well as in portions of Washington State, including Okanogan County. Significant infestations have occurred in this area in recent years, resulting in mortality of entire aspen clones in some cases. Alternatives for control of satin moth currently include application of insecticide to the canopies of infected stands or introduction of biological control agents (parasitic wasps and flies).

Management Actions

- Inventory and map aspen stands and seral conditions.
- Maintain aspen component at its current approximate acreage or greater with a mix of seral conditions at landscape scale.
- Consider the use of prescribed fire or mechanical disturbance within aspen stands if necessary to maintain mixed seral conditions.
- If evidence of insect or disease activity such as satin moth is observed, consult with DNR Forest Health staff to determine the degree of threat posed and appropriate actions.
- Work with Coordinated Resource Management group to implement range management practices to deter livestock from grazing in aspen stands.

Riparian Areas and Wetlands

Riparian vegetation and wetlands occur throughout the NRCA and are often interconnected and similar in their plant composition. Riparian zones are found adjacent to watercourses such as streams, rivers, springs, ponds, and lakes and represent the interface between terrestrial and aquatic environments. On the NRCA, riparian vegetation exists along stream channels of all types within the area, while wetlands are found primarily along streams of low

gradient and/or with wide floodplains, at the head of stream courses, and in depressions on hillsides where moisture accumulates and creates wet or boggy conditions. The width of riparian zones and the types of vegetation found within them depend strongly on elevation, the size and gradient of the stream, and the type of soil present. The size and composition of wetlands are similarly dependent on elevation, soils, and the hydrology of the associated stream system. Many of the wetlands dry out during late summer and early fall, however some of the habitats remain wet or moist throughout the year.

The majority of riparian habitats within the NRCA are shrub-dominated, with various willows being the most common type of shrub, particularly at higher elevations. At lower elevations, some riparian communities along larger streams have a quaking aspen overstory, and black cottonwood may be present along a few of the lowest-elevation riparian areas. Other common riparian plants in the NRCA include Labrador tea, Cascade azalea, bog birch, sedges, rushes, grasses, and various forbs. In general, riparian zones along smaller, intermittent or seasonal streams are narrow and the vegetation is relatively similar to the associated upland communities. Larger and/or perennial streams generally have a wider riparian zone with a more distinctive strip of riparian vegetation. In these habitats, the vegetation may include riparian tree species such as quaking aspen, black cottonwood, or Engelmann spruce, as well as a mixture of riparian shrubs and herbs.

Wetlands in the Loomis NRCA have been grouped into the following two types based primarily on amount of coniferous tree cover:

- *Herbaceous/Shrub Wetland*: Open wet areas with less than approximately 30% tree cover. Includes marshes, herbaceous wet meadows, and shrub-scrub. Plant species typically include willows, bog birch, Labrador tea, Cascade azalea, sedges, rushes, grasses, and various forbs. Some communities have substantial amounts of *Sphagnum* moss.

- *Montane Coniferous Wetland*: Wet areas with approximately 30% or greater cover of coniferous trees. May include small areas of Herbaceous/Shrub Wetland. Plant species composition is similar to Herbaceous/Shrub Wetland except for the greater amount of tree cover.

Naturalists have long recognized the importance of riparian habitats to wildlife for several reasons: (1) the presence of surface water provides a critical habitat component for wildlife and the abundance of soil moisture creates habitat conditions favorable to many wildlife species; (2) the increased humidity, higher rates of transpiration, and greater air movement found in riparian zones create microclimate conditions that differ from adjacent uplands and are preferred by wildlife during hot weather; (3) the plant communities in riparian zones are more complex in their structure and composition and more productive than uplands (Bull 1978); (4) the linear shape of riparian zones make them natural corridors for many wildlife species (Thomas et al. 1979, Brinson et al. 1981, Oakley et al. 1985) and therefore might represent routes of gene flow (West 1988). Because of the unique aspects of riparian zones, some species are specifically associated with riparian zones (Pearson and Manuwal 2001).

Discussion

The condition of wetlands and riparian habitats in the Loomis NRCA with regard to species composition and hydrologic characteristics has not been assessed. Wetland/riparian systems typically have relatively fresh, palatable vegetation late in the growing season and frequently are associated with sources of drinking water for livestock. As a result, grazing is often somewhat concentrated in these areas, particularly late in the season. The concentration of grazing activity and development of trails can lead to impacts to vegetation, soils, and/or hydrology. A variety of impacts may be associated with heavy use of wetlands or riparian zones, such as soil compaction, hoof shear damage, downcutting of stream channels, alteration of flood regimes, and suppression of important wetland/riparian vegetation, particularly shrubs and sedges. Wetlands and riparian areas are included in the HB1309 Ecosystem Standards (B12, B13, B14a, B14b, B15, and B16) and management issues concerning cattle will be addressed specifically in the Resource Management Plans for each permit range.

Maintenance of wetland and riparian habitats is primarily dependent on maintaining the appropriate hydrologic conditions. In the past, occasional fires may have played a role in removing shrub and tree cover; however because of the wet conditions most wetland/riparian habitats probably burned very infrequently.

Management Actions

- Work with permit holders to achieve the Ecosystem Standards for State-owned Agricultural and Grazing Land.
- Maintain a mix of seral conditions on wetlands throughout the NRCA, where they are dominated by native, non-increaser species and have a mix of shrub size classes where appropriate.
- Inventory and map riparian habitats
- Assess trails where they interface with wetlands and riparian zones.
- Relocate or recondition trails to address impacts to natural hydrologic and geomorphic processes.

Shrub-Steppe

High-elevation shrub-steppe (including dry meadows) is found in 200-300 acre patches at 5,000-7,000 feet elevation, generally on dry, south-facing slopes. It consists of non-forested areas dominated by bunch and sod forming grasses, and shrubs, and is mainly devoid of trees. Shrubs, primarily mountain big sagebrush, may be absent, widely scattered, or form a dense stand. Perennial grasses and forbs generally make up the majority of vegetative cover. Some of the areas classified as shrub-steppe do not currently have shrub cover and are actually dry grassy meadows. Occasional trees may be widely scattered.

Plant species typically found in these shrub-steppe communities include mountain big sagebrush, western wheatgrass, Idaho fescue, pinegrass, California brome, various upland sedges, Wheeler's bluegrass, purple oniongrass , and a variety of forbs such as yarrow, pussytoes, prairie smoke, desert-parsley, lupines, and groundsel (refer to Appendix D for scientific names).

Discussion

The condition of shrub-steppe on the NRCA with regard to composition and non-native species has not been assessed. Cattle grazing is often concentrated in these areas due to the availability of desirable forage (grasses, sedges), especially in the early and mid season. Horse/cattle trails also access some of the shrub-steppe habitats on the NRCA, notably Goodenough Park and Disappointment Ridge.

These shrub-steppe habitats occur on warm, dry exposures of the south-facing slopes with poorly developed soils. Fire played a significant role in the past in removing occasional "invader" trees, and more importantly in creating a mosaic of seral conditions (areas with low and high shrub cover). The historic fire regime probably consisted of moderate-frequency (every 20-50 years) low-intensity fires, which would kill most small trees and mountain big sagebrush, leaving a more open grassland until sagebrush and other shrubs re-established. Shrub-steppe communities are probably the most vulnerable on the NRCA to weed invasion. Soil disturbance, including fire, or overgrazing of native vegetation often result in invasion and increase of weedy species.

Due to the low-intensity fire regime in the shrub-steppe zone, prescribed fire may be an option for maintaining ecological processes in that zone. However, fire would need to be carefully implemented in order to minimize any increase in weedy species, particularly non-native annual grasses such as cheatgrass.

Management Actions

- Inventory and map conditions of shrub-steppe, including shrub cover/seral status.
- Maintain a mix of seral conditions in shrub-steppe communities throughout the NRCA.
- Work with permit holders to achieve Ecosystem Standards.

Subalpine/Alpine Grassland and Shrubland:

In the NRCA, alpine vegetation only occurs above approximately 7,000 feet elevation on Snowshoe Mountain. It also occurs in the Chopaka NAP on Joe Mills Mountain, Hurley Peak, and Chopaka Mountain. Alpine communities primarily include grass-, forb-, and sedge-dominated meadows and fellfields, as well as some low shrub-dominated habitats. Some fellfield communities are primarily rock or bare ground with very sparse vegetation. This zone also includes subalpine parkland communities, which consist of subalpine meadows in a

mosaic with scattered trees or tree clumps. These parklands typically have tree cover of less than 30%.

Alpine communities are primarily defined by a short growing season and deep winter snowpacks, which are often combined with summer drought to create extremely harsh growing conditions. Although not well understood, fire may have played a role in the past in maintaining some alpine meadows by removing trees.

Discussion

The condition of alpine vegetation on the NRCA with regard to composition and non-native species has not been assessed. A large area of high-quality alpine vegetation occurs in the adjacent Chopaka NAP. Cattle may use some areas of alpine habitat for grazing, however most of the habitat on Snowshoe Mountain is very difficult to access and not likely to be affected by livestock. Similarly, trail use by horses is likely to be minor. The amount of hiker use on Snowshoe Mountain is unknown.

Whitebark pine stands in sublapine/alpine habitats may be reduced or extirpated by white pine blister rust, an introduced fungus that infects whitebark pine trees (see Subalpine Fir Zone section).

Management Actions

- Maintain alpine communities dominated by native, non-increaser species, with few or no introduced species.
- Maintain a mosaic of shrub/forb-dominated communities and parkland communities.
- Survey/Inventory vegetation in alpine areas.
- Avoid trail development in alpine areas.
- Refer to Sub-alpine fir zone Management Actions for reference to Whitebark pine blister rust.
- Work with permit holders to achieve Ecosystem Standards.

Rock/Talus

Rock/talus includes any areas of significant bare rock, cliffs, boulder fields, or talus. These occur at all elevations within the NRCA but are most common at higher elevations. The habitats are generally devoid of vegetation, although lichen and moss cover may be high.

Discussion

Although a minor habitat in terms of area, these communities are important for a number of wildlife species and for several rare plant taxa that may occur in the area.

Management Action

- Map talus areas and survey them for rare plant and wildlife species.

Harvested Areas

Several areas in the northern block and to a lesser extent in the southern block, have areas that were harvested between1988 and 2000. All of the harvested areas are located in subalpine fir zone forest and have been allowed to regenerate naturally. Regeneration of tree species varies among the harvested units, with some having dense reproduction of lodgepole pine and others having a mix of species including lodgepole pine, subalpine fir, and Engelmann spruce.

Discussion

These areas might be good as a control site for experimental projects to compare different silvicultural prescriptions and their long-term effect on forest structure. These areas and the roads built to access them are also vulnerable to weeds. In keeping with the management goals of the site, the harvested areas will be allowed to recover naturally. Interference may occur if habitat requirements need to be met on a shorter time-line.

Management Actions

- Monitor weed populations and if necessary develop and implement a weed control plan.
- Provide opportunities for research.

C.Plant Species

A thorough rare plant inventory has not been done for the Loomis NRCA. However, some species have been identified and recorded in the Washington Natural Heritage Database. As a result, several species are noted in this plan and more may be identified during future inventory efforts. Other plant species of concern include noxious weeds and non-native invasive plants.

Rare Plants

For the purposes of this document, rare plants are plants assigned

- a federal status category of endangered, threatened or candidate;
- a Washington Natural Heritage Program status category of endangered, threatened, sensitive, or possibly extinct or extirpated in Washington; and/or
- a global or state rank of 1, 2 or 3.

All of these categories and rankings are defined in Appendix C.

Of the plant species known to occur in the Loomis NRCA, none of them have federal status. Table 1 lists rare plant species known to occur within the NRCA and their associated state status and global and state rankings. A thorough rare plant inventory is needed to provide a comprehensive list of rare plants in the NRCA.

Plants are prioritized in Table 1 beginning with state endangered, threatened and sensitive plants. Plants possibly extinct or extirpated in Washington are medium priority, and review groups and watch species are the lowest priority. The state plant species list is currently being updated and plants marked with an * reflect the most current information that will be included in the anticipated revision of the Endangered, Threatened and Sensitive Vascular Plants of Washington with Working Lists of Rare Non-Vascular Species publication.

Table #1. Rare Plant Species List

Federal and State Status	Species	Rank	Habitat
State Threatened	Two-spiked moonwort *Botrychium paradoxum* *	G2S2	Herbaceous/shrub wetland, subalpine/alpine
State Sensitive	Diverse-leaved cinquefoil Potentilla diversifolia var. perdissecta	G3G4S3	Subalpine/alpine, shrub-steppe, rock/talus
	Tweedy's willow *Salix tweedyi*	G3G4S3	Herbaceous/shrub wetland
	Scandanavian sedge Carex norvegica	G5S2	Herbaceous/shrub wetland, subalpine/alpine
Review Group 2	Blackened sedge *Carex atrosquama* *	G4?S1	Herbaceous/shrub wetland, shrub-steppe, subalpine/alpine
	Gray's bluegrass *Poa arctica ssp. arctica*	G5?S1S2	Subalpine/alpine, rock/talus
	Different-nerved sedge *Carex heteroneura* *	G5S2	Herbaceous/shrub wetland, shrub-steppe, subalpine/alpine
State Watch	Jictorin's grape-fern *Botrychium minganense* *	G4S3	Conifer forest, herbaceous/shrub wetland, subalpine/alpine, quaking aspen
	St. John's moonwort *Botrychium pinnatum*	G4?S3	Herbaceous/shrub wetland
	Lance-leaved grape-fern *Botrychium lanceolatum*	G5S3	Herbaceous/shrub wetland, shrub-steppe, quaking aspen
	Moonwort *Botrychium lunaria* *	G5S3	Herbaceous/shrub wetland, shrub-steppe, quaking aspen
	Little grape-fern *Botrychium simplex* *	G5S3	Herbaceous/shrub wetland, subalpine/alpine

G = global status, T = subspecies status, S = state status.
1 = Critically imperiled, 2 = Vulnerable, 3 = Very rare, 4 = Apparently secure, 5 = Widespread, abundant and secure
G#G# or S#S# = uncertainty between ranks.

See Appendix C for complete description of ranks.

Discussion

Eleven of the twelve plant species listed in Table 1 are predominately found in open, non-forest habitats including wetlands, shrub-steppe, grassland, subalpine/alpine meadows, and rocky areas. This includes most of the areas designated as "Sensitive" within the NRCA. Trails access some of these areas, although current recreational use levels do not appear to threaten the plant populations. The primary potential impact is livestock grazing, which is often concentrated in these habitats due to forage and water availability. Heavy livestock use may be detrimental to rare plant populations due to trampling, introduction and spread of weeds, and/or direct grazing.

Adherence to Ecosystem Standards for grazing in these habitats will help to minimize these threats and reduce impacts to rare plants.

The Washington Natural Heritage Program tracks and monitors all plants with a state status of endangered, threatened or sensitive. Endangered and threatened plants usually require a designed monitoring scheme while plants categorized as sensitive may be visually monitored. If the status of a species changes or an extremely rare species is discovered, it may be necessary to modify management prescriptions in order to conserve the species in the long-term.

Management Actions

- Maintain Ecosystem Standards to help ensure that viable populations of rare plant taxa continue to exist, subject to natural variations.
- Survey the project site for rare plants prior to ground disturbing projects.
- Systematically inventory the NRCA for other potential occurrences of endangered, threatened or sensitive plants.
- Work with Natural Heritage botanists to determine appropriate monitoring scheme for two-spiked moonwort.
- Revisit known occurrences of state sensitive plants at least every three years at the appropriate time of year and update their status.

Noxious Weeds

A formal inventory of noxious weeds has not been conducted in the Loomis NRCA. In general, observations indicate that there are currently few, if any, significant populations of weeds on the site. Weed management guidelines are covered in the Management Guideline Chapter of this plan.

Management Actions

- Conduct periodic inspections of disturbed areas (e.g. harvested and burned areas, roads and trails) with high potential for weed invasion,
- Map and document occurrences of noxious weeds.
- Develop and implement weed control plans that use an integrated pest management approach and focus on minimizing impacts of the control methods while effectively controlling target weeds.

D.Wildlife Habitat

Wildlife habitat was prioritized based on federal and state designations and the Natural Heritage Network global and state ranking system. Table 2 includes species listed as threatened or endangered by either federal or state fish and wildlife agencies and species with a global or state rank 1,2 or 3 (definitions of status categories and rankings are provided in Appendix C).

One of the goals for the site is to protect habitat for threatened, endangered and sensitive wildlife. Thus this section describes the types of habitat that are important to the wildlife species in Table 2. Washington Department of Fish and Wildlife manages wildlife species and DNR manages the habitat. DNR will cooperate with Washington Department of Fish and Wildlife on species management. Management activities will comply with Endangered Species Act obligations for all federal listed wildlife species.

Many of these species are wide-ranging and sensitive to human activity and the Loomis NRCA contributes to the overall extent of their home ranges. It is important to note that rankings and listings change, and there may be a lag time between when the status of a species has changed and when the change is reflected in the listing or ranking. For example, current studies indicate a resident population of gray wolf in Washington state (pers. comm. Fleckenstein). However, the state rank has not yet been changed from SA to S1 to reflect this new information. Some species have two G ranks or two S ranks and this indicates uncertainty between two ranks.

Table 2. Priority Wildlife Species

Species	Rank	State Status	Federal Status
Grizzly bear (*Ursus arctos horribilis*)	G4T3T4S1	Endangered	Threatened
Gray wolf (*Canis lupus*)	G4SA	Endangered	Endangered
Wolverine (*Gulo gulo luscus*)	G4T4S1S2	Candidate	Concern
Canada lynx (*Lynx canadensis*)	G5S1S2	Threatened	Threatened
Northern goshawk (*Accipiter gentilis*)	G5S3B,S3N	Candidate	Concern
Astarte fritillary (*Boloria astarte*)	G5T3S2	n/a	n/a
Alpine checkered skipper (*Pyrgus centaureae loki*)	G5T4S2	n/a	n/a
Lustrous copper (*Lycaena cuprea*)	G5S2	n/a	n/a
Manitoba skipper (*Hesperia comma Manitoba*)	G5T5S2S3	n/a	n/a

G = global status, T = subspecies status, S = state status.
1 = Critically imperiled, 2 = Vulnerable, 3 = Very rare, 4 = Apparently secure, 5 = Widespread, abundant and secure
A = Accidental,; infrequent, H = Historical record, U = Uncertain; additional information needed, ? = uncertainty about assigned rank. B = Breeding habitat, N = Nesting habitat, Q = Questionable taxonomy, G#G# or S#S# = uncertainty between ranks.

See Appendix C for complete description of ranks.

Late Successional Forest

Late successional forests are typically structurally and biologically diverse. The complexity of the ecosystem ultimately sustains biodiversity, providing habitat for multitudes of species.

Late successional forests provide a variety of environmental, structural and spatial attributes. These forests usually have at least 4 vegetative layers (mature canopy, sapling canopy, shrub and herbaceous), patchy canopies (variety of tree sizes and spacing), large standing dead trees and coarse woody debris. The distribution of late successional forest across the landscape provides corridors for wildlife dispersal and movement between the Loomis State Forest, the Loomis NRCA and adjacent reserves on federal lands. It also provides habitat for wildlife with large home-ranges, wildlife dependant upon specific structural habitat found within late successional forests and rare, threatened or endangered species.

Discussion

Late successional forest areas identified within the NRCA contribute to a larger network of habitat throughout the Loomis Forest and adjacent land, and will be considered in meeting the goals and objectives of the Loomis Forest Landscape Plan. Over time, the forest mosaic will shift and late successional forests will gradually disappear and reappear across the landscape as environmental, structural and spatial attributes change. Fire and beetles may change late successional forests more rapidly.

Management Actions

- Allow late successional forest characteristics to develop through natural processes and natural ranges of variability.

Grizzly Bear (Ursus arctos horribilis)

The grizzly bear is the larger of the two bear species found in Washington. A grizzly bear can be distinguished from a black bear by its concave face profile, a hump on its shoulders and tracks. While study of this very rugged and remote habitat indicates that this ecosystem is capable of supporting a self-sustaining population of grizzlies, only a "remnant" population remains, incapable of enduring without active recovery efforts, including possible augmentation with bears from other areas (US Fish and Wildlife Service 2000). No resident grizzly bears are known to exist within the Loomis NRCA (Washington Fish and Wildlife Priority Habitat and Species database).

Grizzly bear are listed by the federal government as threatened in Washington (USFWS 1993) and by the state as endangered (WDFW 2002). The US Fish and Wildlife Service delineated six Recovery Ecosystems and the North Cascades Grizzly Bear Ecosystem is the second largest (USFWS 1993). A supplemental chapter was developed to specifically address grizzly bear recovery in the North Cascades and was added to the Grizzly Bear Recovery Plan in 1997. Within the North Cascades ecosystem, Washington's portion is

subdivided into 54 Bear Management Units (BMUs) including the Upper Toats BMU which encompasses the Loomis NRCA.

All naturally vegetated land types are considered suitable grizzly bear habitat as the species ranges over large areas and typically uses many vegetation types to fulfill its life requirements. Habitats of special importance to this wide-ranging species include: wet meadows, swamps, bogs, streams, alpine meadows and parklands, and conifer, sub-alpine, and lodgepole pine forests (Brown 1985). More specifically, they prefer areas with little human disturbance. Grizzly bear "core" habitat is that which is greater than a third of a mile from roads and high use trails (average of 20 or more parties per week).

Discussion

Grizzly bears are sensitive to human activity. The Grizzly Bear Recovery Plan identifies human access management (USFWS 1993) as the single most important tool for managing and maintaining grizzly bear habitat. Direct habitat loss and bear mortality associated with roads and trails, together with indirect behavioral effects (*e.g.*, male - female interactions and avoidance behaviors) associated with roads and trails, may cumulatively impair recovery of small grizzly bear populations like those in the North Cascades.

Management Actions

- Distribute and post safety procedures for avoiding contact with grizzly bear.

Gray Wolf (Canis lupus)

The gray wolf is listed as federally endangered. Wolves are social animals, normally living in packs of 2 to 10 members. Packs are primarily family groups consisting of a breeding pair, their pups from the current year, offspring from the previous year, and occasionally an unrelated wolf. Packs occupy, and defend from other packs and individual wolves, a territory of 20 to 214 square miles (USFWS 2000). In the northern U.S. Rocky Mountains, territories tend to be larger, typically from 200 to 400 square miles (USFWS 2000). In 1990, adults with pups were seen in the Hozomeen area of Washington (North Cascades near Ross Lake at the Canada border). Since 1990, biologists have seen three separate groups of adult wolves with pups in the Cascades (North Cascades National Park 1998). Because of this apparent expansion in the range of wolves in Washington, they may eventually be found within the Loomis NRCA. The gray wolf uses many habitat types as long as there is an adequate ungulate prey base (Laufer and Jenkins 1989). Potential prey for wolves in the Loomis NRCA are: white-tailed deer, mule deer, moose, mountain goats, and bighorn sheep.

Discussion

In late spring, wolves use den sites for maintaining wolf pup temperatures (first 3 weeks), nursing, and protection from potential predators. During these critical early weeks, the pups are especially vulnerable to den site disturbances that keep the female away (Joslin and Youmans 1999). Wolves will sometimes abandon a den if

disturbed by humans (Mech et al. 1991). After denning, rendezvous sites (places where pups are left temporarily while the pack hunts) are often located near water and bordering meadows. Wolves may be sensitive to disturbance at rendezvous sites and may abandon the site in response to human activity (Joslin and Youmans 1999). Consequently, human activities near den and rendezvous sites should be avoided.

Management Actions

- Coordinate with Fish and Wildlife Service, and Washington Department of Fish and Wildlife to determine trail closure dates, locations and other potential management actions.

Wolverine (Gulo gulo luscus)

The wolverine is the largest member of the weasel family and is robust in appearance, rather like a small bear with a broad head, rounded ears, small eyes, short legs, with a dark brown coat with two buff stripes that sweep from the nape of the neck along the flanks and to the base of a long bushy tail. The wolverine is a wide-ranging species and has been characterized as one of North America's rarest mammals and the least known large carnivore. No wolverine sightings have occurred in the Loomis NRCA, however this species may exist in an area and never have been seen. A wolverine and its den were located during the winter of 2001/2002 in the Pasayten Wilderness not far from the Loomis NRCA.

Wolverines in Idaho (Magoun and Copeland 1998) and British Columbia select sub-alpine cirque basins above 8,202 feet elevation with large boulder talus (rocks > 2 meters diameter) for denning. They prefer areas with little or no human activity. Wolverines have a diverse diet that ranges from ground squirrels and marmots to ungulates. Most ungulate in the diet is from carrion, and ungulate carrion is the main food source available in the winter. Avalanche-killed mountain goats can be another source of carrion. Wolverines primarily use coniferous forest (70%), but also use higher elevation habitats with marmots, voles, *etc*., in summer.

Discussion

The most common habitat characteristic is isolation from humans. Wolverine use of an area may be virtually eliminated by human disturbance (*e.g.*, heavy snowmobile or recreational ski use). Direct contact between humans and two denning females in Idaho in late April and May resulted in den abandonment in both cases (Magoun and Copeland 1998). Consequently, providing areas free from disturbance for denning is invaluable to Washington's low-density population.

Management Action

- Coordinate with Fish and Wildlife Service, and Washington Department of Fish and Wildlife to determine trail closure dates, locations and other potential management actions.

Canada Lynx (Lynx canadensis)

Canada lynx stand 2-3 feet at the shoulder are about three feet long and are characterized by a short, black tipped tail, tufted ears, facial ruff, elongated hind legs, and large (3-4") paws. Their large, snowshoe-like paws enable them to inhabit snowy areas often avoided by other predators *(e.g.* coyotes and cougars). Both blocks of the Loomis NRCA have many recorded sightings for lynx.

Mean home ranges of lynx in Washington were from 14 (female) to 21 (male) square miles, but have been recorded as large as 38.2 square miles (Brittell et al*.* 1989, Koehler 1990). Lynx home ranges tend to overlap with mid-successional forests (Saunders 1961, Koehler et al*.* 1979, Kesterson 1988, Major 1989). Lynx inhabit 20-40 year old forests that regenerated after a low to moderate intensity burn (usually stand replacement fires). The habitat characteristics of these forests include high vertical and horizontal vegetative cover, a result of high stem densities, with average tree heights of 7-20 feet (2-6m) and 75-80% crown closure (Parker 1981, Thompson et al. 1989).

The association between lynx and mature and older forests is less clear than their association with mid-successional forests. Some mature forests contain a relatively dense layer of shrubs or regenerating trees and provide habitat for snowshoe hares, the primary food source for lynx. Mature forests also contain structural components currently thought necessary to be suitable denning habitat, including log piles (i.e., deadfall, windfall, etc.), rocks, root tangles, shrub thickets, or similarly dense vegetation. The spatial relationship between mature and mid-successional forests may also influence the use of mature forests by lynx. Wildland fires often leave unburned patches or stringers. In time, as these areas develop into mature forests, they are often used by lynx (Koehler et al*.* 1979, Kesterson 1988, Staples 1995), for foraging and denning sites.

Discussion

Wild fire historically played an important role in maintaining the mosaic of forest and successional stages that provide habitat for both snowshoe hare and lynx (Ruediger et al. 2000). There is a negative correlation between lynx use and the amount of area burned for the first years after a fire (Fox 1978). Hare populations increase with time after stand regneration and populations peak 15 to 30 years after stand re-initiation (depending on tree species, habitat type, and severity of fire). Lynx population numbers are closely tied to the abundance of hare, thus wildfire is beneficial to the lynx through the creation of prey habitat. Consequently, fire may be recommended as a management strategy, especially in regions where the forests are dominated by mature and older forests. Periodic fires can create a mosaic of forest ages across the landscape and as a result, provide patches of appropriate lynx and hare habitat.

Management Actions

- Coordinate with US Fish and Wildlife Service and Washington Department of Fish and Wildlife to meet Canada lynx habitat protection goals and objectives outlined in the DNR Modified Lynx Habitat Plan.
- Adapt management actions as additional research is provided.

Northern Goshawk (Accipiter gentilis)

This species typically nests in mature to old-growth forests composed primarily of large trees with high canopy closure, near the bottom hill slopes, with sparse ground cover, and near water (Squires and Reynolds 1997). Goshawks nest from sea level to the alpine zone and rarely uses forest stands < 25 acres. They hunt in diverse habitats from open sage steppe to dense forests (Squires and Reynolds 1997) and will forage over long distances for relatively large-bodied birds and mammals (squirrels, jackrabbits, snowshoe hare, grouse, corvids, woodpeckers, etc.). In the winter, goshawks use cottonwood riparian areas (Squires and Ruggiero 1995), aspen, spruce/fir, lodgepole pine, ponderosa pine, and open habitats (Squires and Reynolds 1997).

Discussion

This species benefits from late seral forests near water for nesting but will forage in a variety of habitat types. They are considered a "management indicator" species on many national forests because they are potentially sensitive to habitat change.

Management Actions

- Consider potential impacts of management and recreational activities around known and potential nest sites.

Alpine Butterflies

Four alpine butterflies associated with alpine and subalpine plant communities that are rare in the state either occur or are likely to occur within the NRCA: alpine checkered skipper (*Pyrgus centaureae loki*), Manitoba skipper (*Hesperia comma Manitoba*), lustrous copper (*Lycaena cuprea*), and Astarte fritillary (*Boloria astarte astarte*). In Washington, these species are only found within the Okanogan Highlands. The primary distribution of these species outside of Washington includes British Columbia, Yukon Territory and Alberta.

Discussion

The butterflies depend on plant species that are part of the dry alpine mosaic and subalpine plant communities for reproduction and survival.

Management Action

- Management actions are the same as those outlined for the subalpine/alpine grassland and shrubland plant communities (see the Forest Zones and Plant Communities section).

Special Interest Species

Bird species with primarily boreal distributions that occur in the region surrounding the Loomis NRCA include: great gray owl, boreal owl, spruce grouse, white-tailed ptarmigan, boreal chickadee, three-toed woodpecker, black-backed woodpecker and northern bog lemming.

California bighorn sheep were re-introduced to the area in an effort to establish a native population. This species is managed by the Washington Department of Fish and Wildlife as a game species and is not considered rare in the state. However the Washington Department of Fish and Wildlife does have a specific interest in bighorn sheep populations in the Loomis forest area.

Discussion

Boreal species are much more abundant in Canada and inhabit Washington at the extreme southern extent of their range. Usually management activities are prioritized by meeting the needs of rare or listed species, however the overall land management goals of the NRCA are conducive to serving wildlife habitat needs in general.

Management Actions

- Maintain an awareness of indicator species and their natural range of variation.
- Support Department of Fish and Wildlife and the Canadian Wildlife Service efforts to monitor and maintain bighorn sheep populations.

Non-Native Animals

Disregarding livestock, turkeys are the only non-native species sighted in the Loomis NRCA. Impacts from the presence of turkeys have not been documented.

Management Actions

- Conduct periodic inspections of the site for non-native wildlife species.
- As non-native wildlife species are discovered, sightings and disturbance to the site should be documented, and work with the Department of Fish and Wildlife to develop a control plan.

Land Use

It is very likely that the Loomis NRCA was used by Native American Tribes now represented by Colville Confederated Tribes and the Upper Similkameen Indian Band (First Nations People of Canada), however specific documentation of traditional gathering or spiritual sites are not recorded. During the early days of settlement the land was used by sheep herders, cattlemen, hunters, trappers, and mineral prospectors. Through the years land use shifted. Livestock grazing and hunting continued while newer uses such as commercial logging, recreational hiking, equestrian use, snowmobiling, cross-country skiing and snowshoeing developed. Those uses, except for commercial logging, continue today and are included in the management of the NRCA.

Even though the NRCA is in public ownership, it is very important to many of the local residents and citizens throughout the state. Some people relate to the site through generations of memories and family history tied to using the natural resources of the area. Some people feel connected to the site through their strong belief in conservation. Many people claim both.

This section addresses a variety of public use perspectives and offers some direction on how various uses may be accommodated. Table 3 outlines allowed uses and conditions of use.

Table 3. Allowed uses within the Loomis NRCA.

Type of Use	Conditions of Use
Hiking, Nature Study, Photography	All use is subject to "pack-it-in, pack-it-out" guidelines.
Approved Research	Allowed provided that researchers receive approval from DNR prior to conducting their research project.
Cross-Country Skiing Snow-Shoeing	Allowed on all DNR approved trails.
Snowmobile Use	Allowed on DNR approved all season and winter use only trails and play areas as shown in figures 7 and 8.
Camping	Dispersed, "no trace".
Horseback Riding	Allowed on DNR approved all season and summer use only trails as shown in figures 7 and 8. Exception permitted for permit range management.
Fishing & Hunting	Allowed based on historic use and regulated by the Department of Fish and Wildlife.
Livestock Grazing	Allowed with a valid grazing permit.
Pets	Must be on a leash.
Wheeled Motorized Vehicles	Prohibited in all areas except for Thunder Mountain Road and Lone Frank Road. Additional exceptions include agency use, fire suppression, permit range management or written permission from DNR

Incompatible Uses

Some types of use are not compatible with the goals of the Loomis NRCA. When done frequently or by enough visitors, these activities prevent DNR from successfully fulfilling its land management responsibilities outlined in the NRCA Act and the Settlement Agreement. Incompatible uses include any activities that DNR determines to be unsafe, destructive, disruptive or in conflict with the management goals of this plan. They include, but are not limited to:

- Recreation with wheeled (motorized/non-motorized, e.g. mountain bikes) vehicles,
- Removal or alteration of vegetation, soil, or rock, except as part of weed control, habitat restoration projects, permitted livestock grazing or tribal use.

* Note: Wheelchairs are not included in the restrictions listed above.

Conditional Use

Any use not in Table 3 is disallowed, except by temporary permit granted by DNR for Conditional Uses when the proposed use is proven to meet all of the following criteria:

- poses no threat to protected sensitive resources,
- does not compromise or degrade ecosystems and resources on the NRCA,
- provides a net benefit to the NRCA program,
- does not deprive the general public access to enjoyment of the NRCA, and
- does not detract from the general public interest.

Public uses not addressed in this plan will be evaluated in the future based on the following criteria:

- Compatibility with NRCA Statewide Plan public use policies and the settlement agreement for the Loomis NRCA.
- Compatibility with ecological goals outlined in this plan.
- Availability of appropriate sites within the NRCA that are not sensitive to the proposed activity.

Access

North Block

Access to the north block of the NRCA is limited to foot, horseback, and non-wheeled motorized vehicles. Wheeled vehicle access is limited to site management (including permit range management) and emergency vehicles. Visitors can reach the boundary of the north block by traveling on DNR roads (Figure 7, Trails and Roads). The Ninemile Road ends at the Loomis NRCA boundary north of Cold Creek Campground where a gate marks the boundary and limits vehicle access to the Loomis NRCA. The gate is posted with a sign stating that wheeled motorized vehicles are not permitted beyond the gate, however, trespass does occur.

A gate on the Fourteenmile Road half a mile south of the Loomis conservation area boundary also limits wheeled vehicle access, however hikers, horses and snowmobiles are not restricted. An additional gate at the NRCA boundary allows equestrians and hikers to access the site and provides a place to move equipment and cattle around the cattle guard.

The north block can also be accessed by the Albert Camp Trail from Forest Service land. A small gate at the conservation area boundary on the Albert Camp Trial allows hikers and equestrians to pass through while keeping cattle in the permit range area. The area accessed by Albert Camp Trail west of the North Fork Toats Coulee Creek and south of Little Horseshoe Creek was not used in the past for snowmobile use thus snowmobiles are not permitted in this area.

Several other trails provide access to the conservation area for hikers and equestrians from the Pasayten Wilderness. Boundary markers are subtle or non-existent.

South Block

Thunder Mountain and Lone Frank roads both go through the conservation area and carry through traffic (Figure 8, Trails and Roads). Both roads are unsigned and rough. Low-clearance or 2-wheel drive vehicles are not suitable for traveling either road.

Thunder Mountain Road is accessed from the east by state forest roads in the Loomis State Forest and from the west by USFS forest roads in the Okanogan National Forest. Thunder Mountain Road is part of a popular scenic driving loop, however it is closed to wheeled motorized vehicles in the winter and spring months due to snow and wet conditions. The road also serves emergency vehicles.

Lone Frank Road (#3820) crosses the southwest corner of the south block. Users travel on this road with ATVs and snowmobiles to access the area around Tiffany Mountain.

Three trails provide access to the south block area from Forest Service and state land for snowmobiles, equestrians, and hikers. Boundary markers are subtle or non-existent.

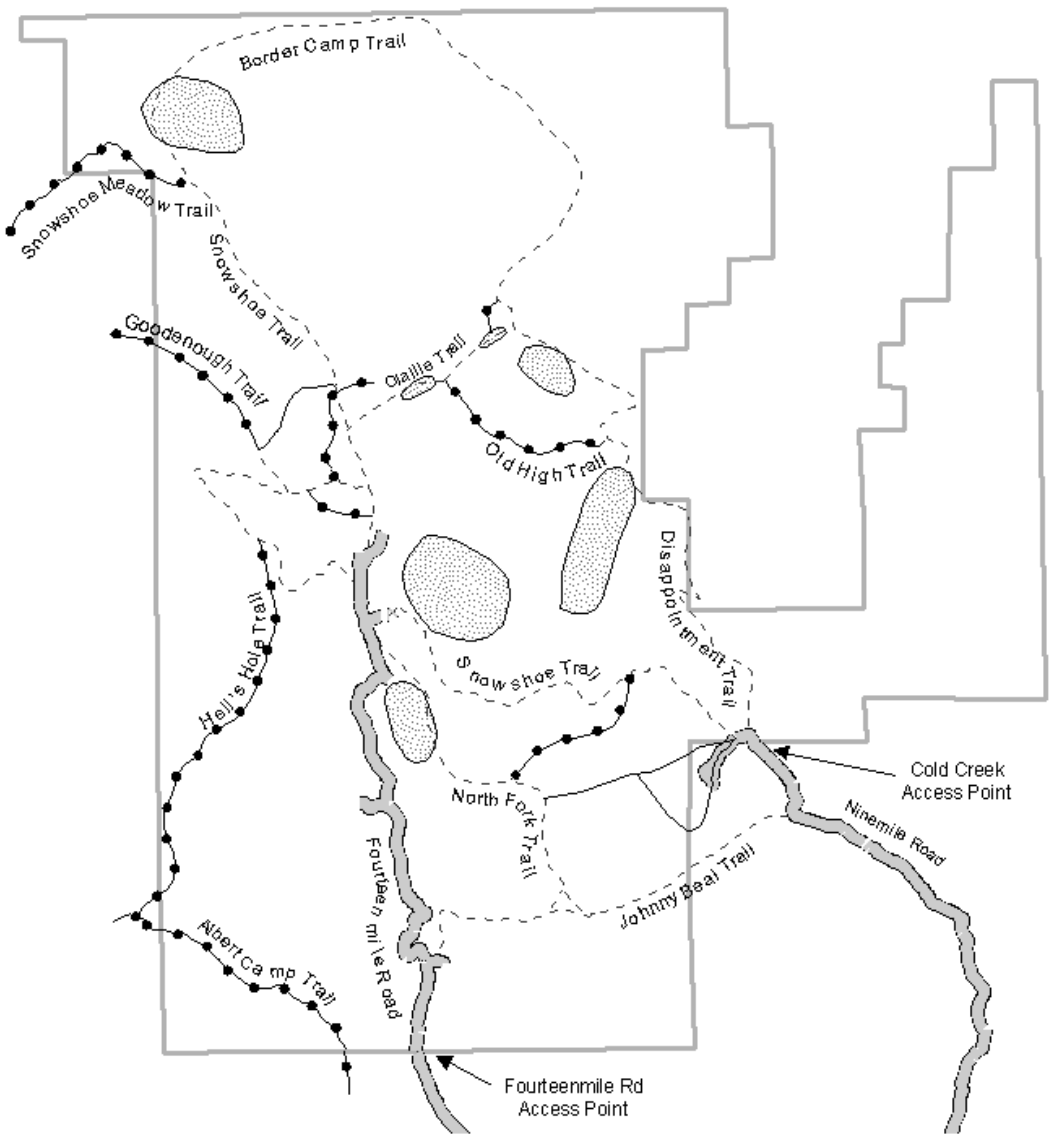
Discussion

The two main access points for the north block are at Cold Creek and Fourteen mile. Trailhead improvements will occur as time and resources allow. A potential location for a trailhead has been identified within the NRCA along the Fourteenmile Road, however a more in-depth site analysis is needed. New signs would help to inform visitors of the boundary of the NRCA and permitted uses.

Management Actions

- Work with user groups to develop and install new signs with a positive message.
- Work with user groups to develop a site plan to serve permitted uses at access points.

Figure 7. Trails & Roads - North Block



Legend

- All season (A) Light Use
- Summer use only
- Winter use only (W)
- Roads
- Loomis NRCA
- Snowmobile Play Areas

*All snowmobile trails are light use trails

**This map shows approximate trail locations.

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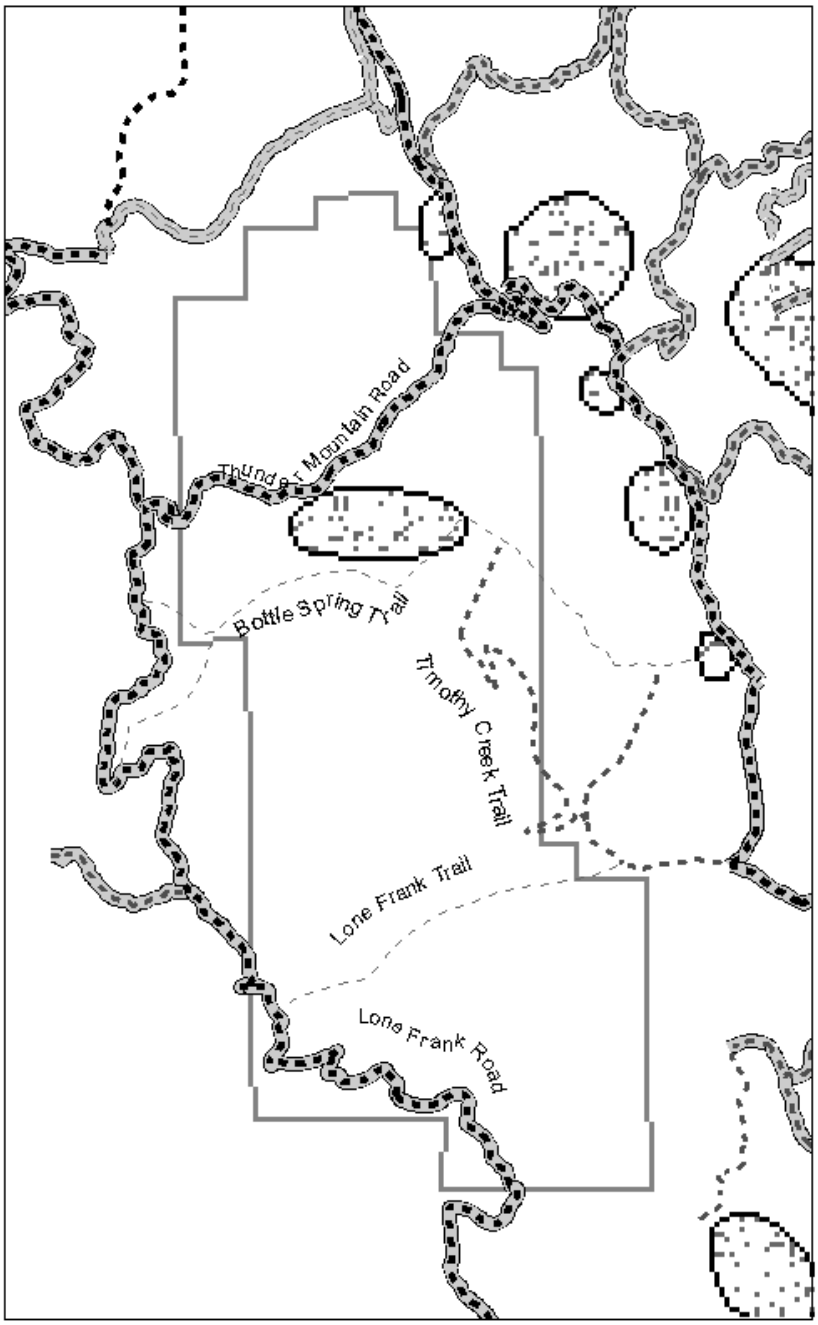
Motorized wheeled vehicle access is limited to emergency, maintenance and range management vehicles.

Figure 8. Trails & Roads - South Block



Legend

All SeasonTrails

- Heavy
- Moderate
- Light
- Roads
- Snowmobile Play Area
- Loomis NRCA

Motorized wheeled access is limited to roads.

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Recreation/Trails

The Statewide Management Plan for NRCAs defines low-impact public use as those activities that do not adversely affect the site's natural qualities. Specifically, activities shall not compromise a site's integrity, ecological, scenic, historic and archaeological values. However, for the Loomis NRCA, snowmobile use, and horseback riding are permitted uses. Hunting does occur and is regulated by the Washington Department of Fish and Wildlife. Figures 7 and 8 show the DNR approved trail system and the uses associated with each trail.

Discussion

The management emphasis for recreation in the Loomis NRCA is to maintain the current trail system with some improvements to trailheads, evaluation of trail locations and installation of signs. These improvements will help provide a safe recreational experience and contribute to the overall management goals of protecting sensitive resources. Uses are discussed in more detail below.

Snowmobiles

Snowmobile trails in the Loomis NRCA are un-groomed, discovery trails and receive a low level of use compared to other snowmobile trails in the Loomis State Forest. In general, trails in the Loomis NRCA are narrow with tight turns, cover difficult terrain through dense forest and are not conducive to high speeds. Management actions, including trail maintenance, should maintain these trail characteristics.

The U.S. Fish and Wildlife Service requested that DNR not allow any increase in designated or groomed over-the-snow snowmobile routes or snowmobile play areas within Lynx Management Units (this includes both blocks of the NRCA). Authorized trail routes and play areas are shown on figures 7 and 8. Furthermore, DNR will manage snowmobile use and will employ strategies to discourage inappropriate use.

Horseback Riding

Equestrian use in the area known today as the Loomis NRCA dates back to the 1890s when settlers hunted, trapped, and herded livestock. Today this user group has expanded to include a recreational riders who generally use the north block to access the Pasayten Wilderness in the summer months. The most popular trails for recreational riding are the Albert Camp Trail and the Snowshoe Trail. In general trails are rough and require maintenance to keep them clear of tree limbs as high as 8-10 feet. Horses are unloaded and loaded from trailers outside of the NRCA. The Bottle Spring and Lone Frank Trails in the south block are also used by horseback riders.

Structures

A few historic, uninhabitable remnants of structures are located in the north block and are used primarily as landmarks and safety shelters for sudden extreme weather. Historically these structures were built and maintained by users. For liability reasons, users are required to have approval to continue maintenance on the structures. DNR

does not assume responsibility for the structures and any construction or improvement to these structures should be reviewed by, and coordinated with Northeast Region staff.

Trails (Roads)

Many of the trails located in the NRCA were established long ago by cattlemen herding cattle throughout the area. Some trails date back to when sheep herders worked the area. Over time trail use expanded to include other users and now the NRCA has several trails that serve cattlemen, recreational equestrians and hikers in the summer; snowmobilers, snowshoers and cross-country skiers in the winter and; hunters in the fall and winter.

In general trails vary greatly in the NRCA. Trail width ranges from 1 to12 feet and some trails are barely visible and others are obvious. Improvements are needed at stream crossings and wet areas. Trails are maintained by users to keep vegetation pruned back and some trails are marked with tree blazes.

Old road beds also contribute to the trail system. The Disappointment Trail (previously known as the Jeep Trail) which starts at the Cold Creek access point is an old, un-maintained road. It is closed to wheeled vehicles except for authorized site management and emergency vehicles. The portion of Fourteenmile Road within the NRCA was built in the late 1980s to haul timber and has created a new trail route and has changed the Snowshoe Trail where it intersects with the North Fork Trail.

Trailheads are not developed and coincide with gate locations. An open area at the Cold Creek “trailhead” provides places to park in the summer months. Equestrians unload their horses at the corrals south of Cold Creek Campground or at Fourteen Mile Recreation Site (USFS). See Access Section in the Land Use Chapter for more detail.

Management Actions

- Assess trail locations and impacts to natural resources and re-route or improve trails to increase user safety and resource protection.
- Develop a trail maintenance agreement with user groups.
- Bring together user groups annually to discuss trail maintenance issues and plan maintenance projects.
- Maintain trails in accordance with trail standards and guidelines outlined in the Guidelines Chapter of this plan.
- Maintain (keep vegetation trimmed back) the portion of Fourteenmile Road that extends into the Loomis NRCA for emergency vehicle access.
- Allow spur roads to revegetate and officially abandon through Forest Practices Rules and Regulations.

Permit Range Management (Grazing)

As already stated, the area now known as the Loomis NRCA has a long history of cattle grazing and several permit ranges overlap with the NRCA. The north block is part of the Chopaka Permit Range and the south block falls within four Permit Ranges: Toats Coulee, Cecile, Sarsapkin, and Salmon Meadows (see Figure #2). Fences and natural barriers delineate the permit ranges and contain cattle. Gate management is important for managing cattle. An important rule of the range is leaving gates as they are found.

Each permit range is managed according to a Coordinated Resource Management Plan and the plans are updated when permits are renewed (every 10 years). Permit holders meet annually with DNR and Natural Resources Conservation Service staff in the fall (Coordinated Resource Management meeting) to review the past grazing season and address specific management issues. In the spring the same group meets to review the grazing schedule for the upcoming season. The grazing schedule includes the turn-out date, total AUMs (animal unit month or cow/calf pair) and grazing schedule (refer to a range-specific Coordinated Resource Plans for more detail).

Generally cattle are herded out to the permit ranges in June and they move down to lower elevations in September and October. Turnout dates change depending on climate conditions. Cattle generally concentrate their grazing where the majority of forage and to some extent, water, are located. This includes open areas such as shrub-steppe, wet meadows, and harvested areas. They tend to avoid steep topography and dense forest.

Discussion

The Coordinated Resource Management Plans are the existing management framework for grazing practices in the NRCA and the Loomis State Forest. After the plans are updated, they will address the ecosystem standards in House Bill 1309. The ecosystem standards were designed to address the impacts of agricultural and grazing practices (on state-owned land) on fish and wildlife habitat. As a result, grazing practices within the Loomis NRCA will be guided by Coordinated Resource Management Plans associated with the permit ranges that overlap with the NRCA.

Management Actions

- Participate in Coordinated Resource Management Meetings and the permit renewal process.
- Use signs to remind users of the importance of closing gates.
- Implement management decisions from Coordinated Resource Management Meetings.

Environmental Education

Currently there is not an organized program or curriculum. However, the site is used occasionally for educational field trips.

Discussion

The Loomis NRCA is approximately 30 miles from Tonasket. Access is limited from November to May due to snow and facilities are rustic to non-existent. As a result, opportunities for groups of students to travel to the site during the school year are limited. However, the site is available for field studies. Research topics include, but are not limited to, wildlife, rare plants, weeds, disturbance ecology (including wildfire), or livestock grazing ecology.

Management Actions

- Conduct a site analysis to determine the site's capacity for outdoor environmental education.
- Identify features of educational value.
- Conduct a survey or interviews to identify environmental education needs of the local communities. Match needs appropriately with site capacity, educational opportunities and proximity to local education centers.
- Determine appropriate means such as brochures, self-guided tours, or interpretive signs for delivering the identified environmental message.
- Exhibit and distribute information on research opportunities to higher education institutions.